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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,451	12/03/2003	Peter J. Hopper	100-18010 (P05268-D01)	7097
33402	7590	09/29/2004	EXAMINER	
LAW OFFICES OF MARK C. PICKERING P.O. BOX 300 PETALUMA, CA 94953			NGUYEN, HA T	
			ART UNIT	PAPER NUMBER
			2812	

DATE MAILED: 09/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/727,451

**Applicant(s)**

HOPPER ET AL.

**Examiner**

Ha T. Nguyen

**Art Unit**

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 14-20 and 22-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14-20 and 22-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12-3-3;6-1-4.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Notice to applicant***

1. Applicants' Amendment and Response to the Office Action mailed 5-20-4 has been entered and made of record.

### ***Claim Objections***

2. Claims 19 and 28 objected to because of the following informalities: Claims 19 and 28 are the repetition of claims 18 and 27, respectively. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. Claim 24 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 24 recites the limitation "the second etching step" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 22-24 and 27-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Lu et al. (USPN , hereinafter "Lu").

Referring to Figs. 1-9 and related text, Lu discloses [Re Claim 22] a method of forming a semiconductor device, the method comprising the steps of: forming a layer of insulation material 12 over a semiconductor substrate 22, the layer of insulation material having a top surface; etching the layer of insulation material to form a first trench 24 in the layer of insulation material, the first trench having a first bottom surface vertically spaced a first distance apart from the top surface (see Fig. 5); and etching the layer of insulation material and the first trench to

form a second trench 30, 32 in the layer of insulation material, the second trench having a second bottom surface vertically spaced a second distance apart from the top surface, and a third bottom surface vertically spaced a third distance apart from the top surface, the third distance being greater than the first distance, the third distance being greater than the second distance (see Fig. 8);

[Re Claim 23] forming a layer of conductive material on the layer of insulation material to fill up the second trench (see col. 5, lines 16-18); and planarizing the layer of conductive material to form a conductive region, the conductive region having a top surface that is substantially planar with the top surface of the layer of insulation material, the conductive region contacting the third bottom surface forming a bottom finger surface that lies parallel to the top surface of the layer of insulation material (see Fig. 9);

[Re Claim 24] wherein the step of etching the layer of insulation material and the first trench includes the steps of: forming a layer of masking material 26 on the layer of insulation material; patterning the layer of masking material to expose the first trench and a portion of the top surface of the layer of insulation material; anisotropically etching the layer of insulation material and the first trench to form the second trench (see Fig. 7);

[Re claims 27-28] wherein a top surface of a single contact 22 is directly connected to the bottom finger surface;

[Re claim 29] wherein the layer of conductive material includes a barrier layer formed on the layer of insulation material; a layer of seed material formed on the layer of barrier material; and a layer of copper formed on the layer of seed material (see col. 9, line 41-col. 10, line 30).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2812

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 14-16 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu in view of Adams et al. (USPN 6566242, hereinafter “Adams”).

[Re claim 14] Lu discloses substantially the limitations of claim 14, as shown above. It also discloses etching the layer of insulation and the trench to lower the bottom surface of the trench such that the bottom surface is vertically spaced a second distance apart from the top surface, the second distance being greater than the first distance (see Fig. 8). But it fails to disclose expressly etching the insulation material to form a plurality of trenches in the layer of insulation material, the top surface of the layer of insulation material having a trench region that lies between adjacent trenches and etching the layer of insulation and the plurality of trenches to lower the top surface of the layer of insulation material in the trench region to form a trench surface that lies below and parallel to the top surface. However, the missing limitation are well known in the art because Adams discloses these features (See Figs. 5-9 and related text ). A person of ordinary skill is motivated to modify Lu with Adams to obtain an interconnection to more than one devices.

[Re claims 15, 16, and 18-20] Arguments similar to arguments used in the rejection of claims 24, 23, and 27-29, respectively, also apply.

Therefore, it would have been obvious to combine Lu with Adams to obtain the invention as specified in claims 14-16 and 18-20.

8. Claims 17, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu or Lu in view of Adams, as applied to above, and further in view of Yu et al. (USPN 5952704).

Art Unit: 2812

Lu or the combined teaching of Lu and Adams discloses substantially the limitations of claims 17, 25 and 26, as shown above.

But it does not disclose expressly wherein the conductive region is formed to have a number of loops; wherein the loops lie substantially in a same plane; the loops being electrically connected together.

However, the missing limitations are well known in the art because Yu discloses these features (See Figs. 1-5).

A person of ordinary skill is motivated to modify Lu or Lu and Adams with Yu to obtain an inductor with reduce parasitic capacitance (see Yu, abstract).

### ***Response to Amendment***

9. In view of applicants' cancellation of the claim, the rejection of claim 21 under 35 U.S.C. 102 is rendered moot.

In view of applicants' arguments and the amendment to the claim, the rejection of claim 15 under 35 U.S.C. 112 second paragraph, as being indefinite, has been withdrawn.

In view of applicants' arguments and the amendment to the claim, the rejections of claim 14-20 and 22-29 under 35 U.S.C. 102 or 103, as stated in the Office Action mailed 5-20-4, have been withdrawn.

Applicants' arguments are moot in view of the new rejections.

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for response to this final action is set to expire THREE MONTHS from the date of this action. In the event a first response is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will

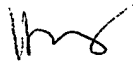
Art Unit: 2812

the statutory period for response expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ha Nguyen whose telephone number is (571) 272-1678. The examiner can normally be reached on Monday-Friday from 8:30AM to 6:00PM, except the first Friday of each bi-week. The telephone number for Wednesday is (703) 560-0528.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Neibling, can be reached on (571) 272-1679. The fax phone number for this Group is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



Ha Nguyen

Primary Examiner

09- 27 - 04